REMARKS

Claims 1 to 22 are pending in the application.

§103

Claims 1 to 22 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,634,988 to Kurebayashi et al. alone or in view of CA 2,429,439.

This rejection is respectfully traversed.

U.S. Patent No. 5,634,988 was first cited in the Office Action mailed March 13, 2009 and the rejection of this Office Action was a final rejection.

Patentability

U.S. Patent No. 5,634,988 ("US '988") is directed to a high tensile welded steel plate having excellent fatigue strength at its weld and good weldability.

The preset invention is directed to a steel plate for a linepipe "having a microstructure composed of degenerate upper bainite of more than 70%." That is, the degenerate upper bainite microstructure of more than 70% of the present invention is the microstructure of the base steel.

The bainite microstructure disclosed in US '988 is the HAZ microstructure not the microstructure of the base steel.

US '988 discloses at Col. 4, line 48 to Col. 5, line 12:

> (3) The described invention relies on the following microscopic observation on the occurrence and propagation of cracking of a fatigue specimen for a weld joint and, as a result, the present inventors have found the relationship between the HAZ micro-structure and the fatigue strength. The HAZ mciro-structure is classified according to the hardenability of the steel into ferritic micro-structure, bainite micro-structure, and matensitic micro-structure and the HAZ micro-structure of commercially available high-tensile steels is, in many cases, a bainite micro-structure. In this case, the bainite micro-structure includes both an upper bainite structure and a lower bainite micro-structure,

> and the proportion of the bainite structure to the whole micro-structure as observed under a microscope is defined as the bainite micro-structure fraction.
>
> When the hardenability of the HAZ micro-structure is low, the ferritic micro-structure fraction is higher than 20% and the bainite micro-structure fraction is lower than 80%, the fatigue cracking is likely to start from grain boundary ferrite or a soft ferritic micro-structure, such as ferrite side plate, so that the fatigue strength is not improved. On the other hand, when the hardenability is high, the martensitic micro-structure fraction is higher than 20% and the bainite micro-structure fraction is lower than 80%, the fatigue cracking starts at the grain boundary in the interface of a hard martensitic micro-structure. In this case as well, no improvement in fatigue strength can be attained.
>
> Based on the above finding, it was confirmed that an improvement in fatigue strength is derived from the bainite micro-structure, and when the fraction of the bainite micro-structure is not less than 80%, the effect of improving the fatigue strength becomes significant.

It is submitted that the position of the Office Action that US '988 discloses the base steel having a bainite microstructure of more than 80% is not correct. US '988 clearly discloses that the HAZ microstructure has a bainite microstructure of more than 80%. US '988 does not disclose or suggest the microstructure of the base steel.

A characteristic feature of the present invention is that the microstructure of the base steel of the steel plate for an ultra-high-strength linepipe is composed of more than 70% degenerate upper bainite. The present invention does not claim the HAZ microstructure.

It is well known that the microstructure of the base steel before welding cannot be determined from the microstructure of the welded HAZ structure because of the heat of welding.

US '988 does not disclose or suggest the microstructure of the base steel composed of more than 70% degenerate upper bainite.

The Office Action takes the position that the steel compositions of US '988 meet the claimed ranges of the steel composition of the present invention. Applicants submit that this is an error.

In the present invention, both Mo and Nb are indispensable components of the steel composition. In Table 1 of US '988, there is no example of a steel containing both Mo and Nb except Steel No. 16. In Steel No. 16, the Mo content is 0.07%, which is lower than the minimum claimed Mo content of 0.15%. Likewise, in Steel No. 16 of Table 1 of US '698, C is 0.08%, Si is 0.87% and Mn is 0.99%. The claims of the present invention require a maximum of 0.07% C, a maximum of 0.6% % Si and a minimum of 1.5% Mn.

US '988 does not disclose or suggest the steel composition of the present invention.

With respect to tensile strength, US '988 in Table 2 discloses a tensile strength of 508 to 605 MPa. The tensile strength of steel plate of the present invention is 880 to 1080 MPa. The tensile strength of the present invention is very different than the tensile strength of US '988.

US '988 does not disclose or suggest the tensile strength of the present invention.

CA '439 has been previously discussed in detail. CA '439 does not cure the defects in the disclosure of US '988.

It is therefore submitted that claims 1 to 22 are patentable over US '988 standing alone or in combination with CA '439.

CONCLUSION

It is submitted that in view of the foregoing remarks, the application is now in condition for allowance. It is therefore respectfully requested that the application be allowed and passed to issue.

Respectfully submitted,

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